Transportation Engineering Analysts
Joseph D. Blaschke, D. Eng., P.E., President

1008 Woodcreek Drive, College Station, Texas 77845 · 979/693-5800 · Fax: 979/693-5870 · e-mail: jblaschke@verizon.net

April 16, 2009

McClure & Browne Engineering/Surveying, Inc.
ATTN: Mr. Jeffery L. Robertson
1008 Woodcreek Drive
Bryan, Texas 77802

RE: ***FM 1179 Widening at Brownstone Drive***

Dear Mr. Robertson:

You have asked me to assist you in the modification of FM 1179 at and in the vicinity of the proposed intersection of Brownstone Drive in Bryan, Texas. Brownstone Drive is a proposed collector street that will intersect FM 1179 between Boonville Road and Copperfield Drive on its northwest side to form a "Tee" intersection. At its intersection with FM 1179, Brownstone Drive will be a four-lane, divided roadway with a 15-foot-wide median (16-foot-wide median measured from face of curb to face of curb). At the proposed location of this intersection, FM 1179 is a two-lane highway striped with 12-foot-wide travel lanes and 2-foot-wide paved shoulders, aligned essentially northeast/southwest. For the purposes of this report, I shall assume that FM 1179 is aligned east/west, and that Brownstone Drive will intersect FM 1179 on its north side.

It is your desire to provide a left-turn lane on FM 1179 at its intersection with Brownstone Drive. The most efficient manner of providing this left-turn lane is to widen FM 1179 in both directions from its centerline to provide a 12-foot-wide left-turn lane at the intersection. The taper to accommodate the widening should be consistent with high-speed operations because of the 55-mph speed limit on FM 1179.

The first design criteria necessary to provide the design is to determine the length of the left-turn lane. Because there is no existing traffic at the proposed intersection, several assumptions have to be made. Brownstone Drive will be a collector street that will extend from FM 1179 northwestward into the Austin's Colony subdivision and indirectly connect with Austin's Colony Parkway. Most likely, Brownstone Drive eventually may accommodate traffic volumes similar to the higher-volume minor collector streets in Bryan, which would be about 5,000 vehicles per day, or 2,500 vehicles in each travel direction. A peak-hour volume at the intersection likely would be as much as 15 percent of the daily volume (because of the high amount of residential traffic expected) which would be about 375 vehicles traveling in one direction on Brownstone Drive during the peak-hour.

Because of current development in Bryan, it would be expected that a much higher percentage of traffic would be accessing Brownstone Drive from FM 1179 rather than via the Austin's Colony Parkway area simply because the major generators in the Bryan/College Station community are located west and south of the intersection. Hence, it would be expected that 67 percent (2/3 to 1/3 split) of vehicles on Brownstone Drive will enter from FM 1179, and that 90 percent of these vehicles will be turning left onto Brownstone Drive from eastbound FM 1179. Using the potential peak-hour left-turning volume (375 vehicles per hour) and multiplying that figure by 67 percent and 90 percent, the estimated peak-hour volume of vehicles turning left from FM 1179 onto Brownstone Drive is 225.

The amount of storage in the left-turn lane (in feet) necessary to accommodate a peak-hour turning volume of 225 vehicles is approximately equal to this volume times 0.83. The product of these two values is about 187. Hence, the length of the left-turn should be about 186 feet.

Once the length of the left-turn lane is established, then the design of the transition to the left-turn lane can be determined. I have prepared on the attached Figure, a sketch to illustrate the proposed design for the left-turn lane and the transitions necessary to provide the left-turn lane. As shown in the sketch, the transition should begin from the west (and moving toward the east) from a distance of 510 feet west of the "return" located on the western edge of Brownstone Drive. The current 28-foot-wide pavement on FM 1179 should be widened to 40 feet over a length of 330 feet (a 55:1 taper), which would be accommodated by widening both sides of FM 1179 by 6 feet. At a distance of 180 feet west of the edge of the "return," the full 40-foot-wide paved section is accomplished and carried forward into and through the intersection.

The taper on the south side of the newly-formed FM 1179 "median" should be redirected to form the left-turn lane starting at a distance of 220 feet east of the beginning of the 330-foot-long taper. The completion of the taper to form the left-turn lane ends 110 feet later where the full-width left-turn lane begins (and at the same point as the end of the 330-foot-long taper and where the full 40-foot-wide pavement width begins as well). The 110-foot-long taper to form the left-turn lane should be accomplished with a reverse curve. The full-width left-turn lane should be continued for a distance of 180 feet, ending at the west end of the "return."

The full 40-foot-width should be continued eastward at the point from which it begins into and through the intersection and ended at the easternmost end of the "return" on the east side of Brownstone Drive. From that location eastward, the roadway should then be tapered back to its original 28-foot-wide cross-section, over a distance of 330 feet and along a 55:1 taper.

I believe that the sketch and the information provided should be sufficient to explain the justification for the length of the left-turn lane and the appropriate tapering lengths. If you need additional information, please do not hesitate to contact me.

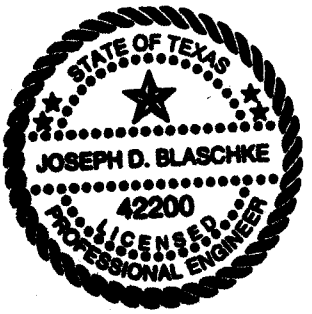
Thank you for allowing me to assist you in this project.

Respectfully submitted,

Joseph D. Blaschke, D.Eng., P.E.
President
Firm Registration No.: F-126

JDB/sb

Attachment



McCLURE & BROWNE
Engineering/Surveying, Inc.
1008 Woodcreek Drive, Suite 103 • College Station, Texas 77845
979-693-3838 Fax: 979-693-2554

Project: BROWNSTONE DRIVE MBESI No.: _____

By: JDB Date: 4/16/09 Page 1 of 1